

REMARKS

Amendments to claims 24, 34, and 40 are for the purpose of clarifying what Applicant regards as the claimed invention. No new matter has been added.

Applicant wishes to thank the Examiner for withdrawing the previous §102 rejections based on Kalend, and the previous claim objection.

I. Claim Rejections under 35 U.S.C. § 102 based on Schweikard

Claims 1, 10, and 15

Claims 1-4, 6-12, 14-17, and 20-23 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent Application Publication No. 2004/0092815 (Schweikard). Applicant respectfully notes that in order to sustain a claim rejection under § 102, each of the claim elements must be found, either expressly or inherently, in the cited reference.

Claim 1 recites acquiring *a sequence of images that are generated using an imaging device*, the sequence of images comprises at least a first image and a second image of a target region, and determining a first composite image based at least in part on the first and second images (Emphasis Added). Claims 10 and 15 recite similar limitations. Schweikard does not disclose or suggest the above limitations.

According to pages 4-5 of the Office Action, Schweikard allegedly discloses comparing a pre-therapy image with a therapy image to obtain a composite image. However, Applicant respectfully notes that the pre-therapy image in Schweikard is a “DRR” image (paragraph 23) obtained using a CT machine, while the therapy image is a “x-ray” image (paragraph 44) obtained using a treatment machine. Since the CT machine and the x-ray machine in Schweikard

are separate imaging devices, Schweikard clearly does not disclose or suggest that the first image (which is analogized by the Examiner as the pre-therapy image) and the second image (which is analogized by the Examiner as the therapy image) are generated using a same imaging device, as required in claim 1. For at least the foregoing reasons, claims 1, 10, and 15, and their respective dependent claims, should be allowable over Schweikard.

According to page 3 of the Office Action, the Examiner believes that claim 1 does not require an (i.e., singular) imaging device to generate both the first and second images. However, Applicant respectfully notes that claim 1 clearly requires that the sequence of images (with the first and second images) be generated using “an imaging device”. As discussed, Schweikard fails to disclose or suggest such features. Thus, the *prima facie* case of the § 102 rejections based on Schweikard cannot be established. In addition, Applicant notes that Schweikard in fact *teaches away* from using an image device to generate two images. This is because Schweikard states that x-ray does not show the target region, and teaches addressing this problem by associating the x-ray image with a three-dimensional image (i.e., a DRR image, which is generated using a different imaging device) (paragraph 44). If the two images in Schweikard being associated with each other are generated using the same imaging device (e.g., x-ray machine), then the problem described in paragraph 44 of Schweikard cannot be addressed. Thus, Schweikard clearly *teaches away* from generating the two images to form a composite image using an imaging device. For these additional reasons, claims 1, 10, and 15, and their respective dependent claims, are believed to be allowable over Schweikard.

Claims 24, 34, and 40

Claims 24-26, 32-36, 38- 42, and 47-48 stand rejected under 35 U.S.C. § 102(c) as allegedly being anticipated by U.S. Patent Application Publication No. 2004/0092815 (Schweikard).

Claim 24 has been amended to recite a template having an image and treatment data, wherein the treatment data comprises one or more parameters for controlling an operation of a radiation machine, and *the treatment data in each of the templates is pre-determined before a treatment session and forms a part of the corresponding template together with the corresponding image* (Emphasis Added). Claims 34 and 40 have been amended to recite similar limitations. Schweikard does not disclose or suggest the above limitations. According to page 6 of the Office Action, Schweikard allegedly discloses matching anatomical image with a template image to determine location and shape of target region, and the location and shape are then used to determine a beaming direction. The Examiner then analogizes the beaming direction as the claimed “treatment data.” However, Applicant respectfully notes that such characterization of Schweikard still does not establish the prima facie case of the § 102 rejections. This is because the beaming direction (which is purported to be the claimed “treatment data”) in Schweikard is determined during treatment session. Therefore, the treatment data (i.e., the purported “beam direction”) in Schweikard clearly is not “pre-determined before a treatment session” as required in the claims.

Also, there is nothing in Schweikard that discloses or suggests providing any “template” that includes both image and treatment data. Just because treatment data and image are

purported to be disclosed in Schweikard in the Office Action, it does not mean that Schweikard discloses forming any template using these two things.

For at least the foregoing reasons, claims 24, 34, and 40, and their respective dependent claims, should be allowable over Schweikard.

II. Claim Rejections under 35 U.S.C. § 103 based on Kalend

Claims 1-5, 11-13, and 16-19 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,784,431 (Kalend) in view of U.S. Patent No. 6,125,166 (Takeo).

Claim 1 recites acquiring a sequence of images that are generated using *an imaging device*, the sequence of images comprises at least a first image and a second *image of a target region* (Emphasis Added). Claims 10 and 15 recite similar limitations. Kalend and Takeo does not disclose or suggest the above limitations. Rather, Kalend discloses two modes of image processing. In the first mode, reference image is generated using system 1, the patient is then transferred to system 1' at which portal image is generated, and the reference image and the portal image are then matched (see figure 1, and column 4, line 4 to column 5, line 32). Since Kalend specifically teaches using separate systems 1 and 1' to generate the reference and portal images, respectively, Kalend clearly does not disclose using *one* image device to generate two images to form a composite image.

In the second mode of imaging, a portal image is compared with another portal image (figure 11, and column 9, lines 8-21). Although the two portal images in the second mode of imaging are generated using a same system, it is important to note that Kalend specifically

describes that the portal images themselves do *not* show image of a target (column 1, lines 58-60, stating that “the tumor area is usually not visible in the portal x-ray”). Thus, in the second mode of image processing in Kalend in which only portal images are involved, the portal images do not have images of a target region, as required in claim 1.

The cited passage of Takeo also does not disclose or suggest the above limitations, nor is it being relied upon for the disclosure of the above limitations. Since both Kalend and Takeo do not disclose or suggest the above limitations, any purported combination of these references does not, and cannot result in the subject matter of claims 1, 10, and 15. For at least the foregoing reasons, claims 1, 10, and 15, and their respective dependent claims, should be allowable over Kalend, Takeo, and their combination.

Claim 1 also recites determining a first *composite image* based at least in part on the first and second images, wherein the determining comprises *performing an image subtraction* using the first and second images from the sequence (Emphasis Added). Claim 10 and 15 recite similar limitations. Applicant certainly agrees with the Examiner on page 8 of the Office Action that Kalend does not disclose determining a composite image that involves performing an image subtraction. According to the Office Action, Takeo allegedly discloses image subtraction, and therefore, it would have been allegedly obvious to use the image subtraction of Takeo in the method of Kalend. However, Applicant respectfully notes that the image subtraction of Takeo cannot be used in the method of Kalend to form the composite image. This is because Kalend specifically teaches adding (not subtracting – which is the opposite of adding) the two images. In particular, column 5, lines 18-32 discloses:

The coarse alignment module 33 produces a general alignment of the two images, and then the fine alignment module 35 uses robust motion flow to rapidly and

accurately complete matching of the images. The display device 37 can present the matched images in different ways. In one embodiment, the display 37 alternates between the two images at about 6 to 20 Hz, but usually about 12 Hz, so that *the observer views the images superimposed as a composite image 59, as shown in FIG. 2c. As can be seen in the example, the treated area 55' in the matched portal image, overlays the tumor 51' in the matched simulation image.* In another type of display (not shown), the outline of the treated area from the portal image is projected onto the processed simulation image, so that it can be seen if the targeted tumor was in fact treated.

(Emphasis Added)

Since, Kalend specifically requires that the two images be overlaid to superimpose the two images (i.e., essentially adding the images), Kalend actually teaches away from image subtraction. Note that no prima facie case of any § 103 rejection can be established if a cited reference teaches away from a claimed feature.

Also, Kalend teaches superimposing the two images so that the observer can view both “the images” as a composite image. On the other hand, the purported combination to use image subtraction in Kalend would make it impossible to see both images together in a superimposed configuration. Thus, the purported combination would render the Kalend reference inoperable for its intended purpose. Note that no prima facie case of any § 103 rejection can be established if a purported combination of references would render a reference inoperable for its intended purpose.

For these additional reasons, claims 1, 10, and 15, and their respective dependent claims, are believed allowable over Kalend, Takeo, and their combination.

III. Claim Rejections under 35 U.S.C. § 103 based on Schweikard and Kalend

Claims 27, 31, 37, 43, 46, 49, 50, 53-55, 57-59, and 62-66 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Schweikard in view of Kalend.

Claim 49 recites enhancing a moving object in the input image based on a movement of the object, wherein the object comprises a part of the target region. Claims 55 and 58 have been amended to recite similar limitations. Both Schweikard and Kalend do not disclose or suggest that any act of enhancing a moving object in an image is based on a movement of the object. Thus, any purported combination of these references does not, and cannot, result in the subject matter of claims 49, 55, and 58.

Also, the Office Action has not alleged that the above features are disclosed in any of the cited references. Thus, the prima facie case of the § 103 rejections for claims 49, 55, and 58 based on Schweikard and Kalend has not been established.

For at least the foregoing reasons, claims 49, 55, and 58, and any claims depending therefrom, should be allowable over Schweikard, Kalend, and their combination.

CONCLUSION

Based on the foregoing remarks, all claims are believed allowable. If the Examiner has any questions or comments regarding this response, the Examiner is respectfully requested to contact the undersigned at the number listed below.

To the extent that any arguments and disclaimers were presented to distinguish prior art, or for other reasons substantially related to patentability, during the prosecution of any and all parent and related application(s)/patent(s), Applicant(s) hereby explicitly retracts and rescinds any and all such arguments and disclaimers, and respectfully requests that the Examiner re-visit the prior art that such arguments and disclaimers were made to avoid.

The Commissioner is authorized to charge any fees due in connection with the filing of this document to Vista IP Law Group's Deposit Account No. **50-1105**, referencing billing number **VM 03-006**. The Commissioner is authorized to credit any overpayment or to charge any underpayment to Vista IP Law Group's Deposit Account No. **50-1105**, referencing billing number **VM 03-006**.

Respectfully submitted,

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